**Access and Availability of Water in Urban areas of Tamil Nadu**

1Research Associate, Central Theme, RUSA 2.0, Bharathidasan University,

2Coordinator & Head, Department of Social Work, Bharathidasan University,

**Introduction:**

India currently stores only 6% of its annual rainfall or 253 billion cubic meters (8.9×1012 cu ft), while developed nations strategically store 250% of the annual rainfall in arid river basins. India also relies excessively on groundwater resources, which accounts for over 50 percent of irrigated area with 20 million tube wells installed. India has built nearly 5,000 major or medium dams, barrages, etc. to store the river waters and enhance ground water recharging. The important dams (59 no’s) have an aggregate gross storage capacity of 170 billion cubic meters (6.0×1012 cu ft). About 15 percent of India’s food is being produced using rapidly depleting /mining groundwater resources. The end of the era of massive expansion in groundwater use is going to demand greater reliance on surface water supply systems.

As per Ministry of Housing and Urban Affairs, 135 liters per capita per day (lpcd) has been suggested as the benchmark for urban water supply. For rural areas, a minimum service delivery of 55 lpcd has been fixed under Jal Jeevan Mission, which may be enhanced to higher level by states.

Indian Council for Agriculture Research (ICAR) Director General T Mohapatra pointed out that the per capita annual water availability has declined to 1,508 cubic meter in 2014 from 5,177 cubic meter in 1951. The per capita availability of water is estimated to decline further to 1,465 cubic meters by 2025 and 1,235 cubic meter by 2050. If it declines further to around 1,000-1,100 cubic meters, then India could be declared as water-stressed country. (The Hindu Business Line, 2019). Because of Indian’ using the ground water then other sources. But they lack of storage habit would lead to the water issues.

By 2050, at least 30 Indian cities will face a grave water risk, according to the WWF. The problems range from poor management of water sources, contaminated supplies, leaky distribution networks and vast volumes of untreated wastewater being poured into India's rivers (Kaushik Deka, 2021). The water budget based on Ministry of Water Resources estimates shows utilizable water of 1,123 billion cubic meters (BCM) against current water demand of 710 BCM, suggesting more than adequate availability at the aggregate level given current requirements. The Standing Subcommittee of the Ministry of Water Resources estimates total water demand rising to 1,093 BCM in 2025, which reaffirms a comfortable scenario at the aggregate level even in 2025. Our World filled with 97.2 percent of salty water, availability of good water 2.8 percent. The source of good water is 30.1 percent from ground water and 0.9 per cent other source. Other water means 87 per cent lakes, slough 11 per cent and rivers are 2 percent (Training Manual, State Institute of Rural Development, 2018).

Water availability per person is dependent on population of the country and for India, per capita water availability in the country is reducing due to increase in population. The average annual per capita water availability in the years 2001 and 2011 was assessed as 1816 cubic meters and 1545 cubic meters respectively which may further reduce to 1486 cubic meters and 1367 cubic meters in the years 2021 and 2031 respectively (Ministry of Jal Shakti, 2020). Indians using 80 per cent of good water used for agriculture, 5 per cent water using for domestic purpose and 15 per cent of the water using for factories (NITI Aayog, 2018).

According to 2001 census India Urban population was 28.53 %, which proportion was increasing to 35.4 % in 2021 census. Tamil Nadu is one of the most rapidly industrialising and urbanising states and is the third most urbanised state in the country in India, with 48.45 per cent of its population living in urban areas. Tamil Nadu will continue to grow its urban population and the number of voters in urban area had also increased in the past ten years. (Deccan Chronicle, July 4th 2017). An increasing urban population has been creating a huge gap between demand and supply of water every year. In India 2,00,000 population was died due to 70 % of water contaminated (NITI Aayog, 2020). The last Census estimated that approximately only 70 per cent of urban towns have access to safe drinking water. The minimum per capita supply of water required in urban areas varies from 70 lit/day to 130 lit/day, and this requirement of water supply varies according to the land use classification of the towns. The 2.7 crore urban population of Tamil Nadu require a wide range of urban services including water supply, sewerage, solid waste management and streets as well as social infrastructure like schools, hospitals, markets and so on. The 2019 Chennai water crisis was a water crisis occurring in India, most notably in the coastal city of Chennai in Tamil Nadu (Nagarajan, 2021). Drinking water problem is increasing in cities in Tamil Nadu. 90 percent of surface water bodies are polluted and people are rarely aware of the need to conserve rainwater. In addition, the water land is polluted by dead oak trees, plastic and waste. Based on ever urgent social demand for water surveying, in this context this paper tried to analyses the access and availability, quality and influences of scarcity of water in Tamil Nadu.

**Objectives:**

Main objectives are given below:

* To study the access of water in urban areas of Tamil Nadu
* To study the influence of the water issues in urban areas of Tamil Nadu

**Methodology:**

Above the study was conducted in three districts, like (1) Ariyalur , (2) Peramablur and Ooty, those districts have different geographical nature. Ariyalur district located in the Central eastern part of the Tamil Nadu lies between North Latitudes 10o52’30”- 112552’20” and East Longitudes 78o57’00”- 79o31’00”. Ariyalur district with Headquarter at Ariyalur consists of two revenue division of Ariyalur and Udaiyarpalayam. The district comprises 15 Firkas with 201 village Panchayats, two Town panchayats and Municipalities. It is an inland district without coast line. Perambalur is the one of district of Tamilnadu state, Latitude and longitude coordinates are: **11.230000, 78.879997.** Towns place category with the gaps coordinates of 11° 13' 48.0000'' N and 78° 52' 47.9892'' E. The city is divided into 21 wards, it has population of 49,648 of which 24,65 are males while 24,989 are females as per report released by Census India 2011. Perambalur Municipality has total administration over 12,732 houses to which it supplies basic amenities like water and sewerage. It is also authorized to build roads within Municipality limits and impose taxes on properties coming under its jurisdiction.Perambalur Municipality has 21 wards.

Udhagamandalam, popularly known as Ooty, it is the capital of Nilgiris District. It is nestled at an altitude of 2240 meters above Mean Sea Level and spread out at 11.24 degrees North latitude and 76.44-degree longitude. Ketti is a selection Grade Town Panchayat, constituted in the year 1920. The Town is coming under the administrative territory of Nilgiri District. Because 75 per cent of Agricultural land is surround in this area. The Ketti Town Panchayat situated at the top of View point of Udhagamandalam. The Ketti Town Panchayat has 64 habitations, 18 wards and 120 streets. The total extent is 19.20 sqkm with total population of 23,229 out of which male 11,476 and female 11,753 as per 2011 census. The study conducted in Ooty Municipality like L Hill, Kandal, as well as Mission compound area, Mickel colony, New Line and Kammand in Ketti Town panchyat

The data base of this paper the Authors’ RUSA 2.0 Social Science, Work titled “Access to Water, Sanitation, Hygiene (WASH) in Urban, Peri-Urban Areas in TN- Challenges & Concerns of Gender Environment & Marginalized Communities”. This study was based qualitative method, data collection was made by through focus group discussion, which aims to analyze availability, and accessibility of water and the quality of water for drinking and non-drinking purpose in Perambalur, Ariyalur and Ooty Municipalities and Town panchayats. The study ran from August - September 2022. The venue was chosen to ensure accessibility for all, absolute neutrality, and a relaxed and quiet atmosphere. The date and time of the meeting considered the personal constraints of most participants. Each participant was contacted the day before the meeting date to ensure their presence and to answer any questions. Arrangements were also made to record all discussions.

In addition to handwritten notes in local language (Tamil) during the focus groups, the discussions were recorded and later transcribed and translated into English. All questions were open questions. The topics covered were: importance of surface water, the quality of surface water sources used for drinking, the sources of contamination of surface water, types of surface water bodies, storage capacity of water bodies, trend of water bodies, current situation of water bodies, known and using the surface water in Ariyalur, Perambalur and Nilgiris districts. The privacy and confidentiality of the interviewees, and positive interactions between the individuals and the interviewer, were maintained during data collection.

Additionally, 84 participants were participated in the seven focus groups discussion, A total of 7 group discussions were held in 3 districts, out of which 2 groups were held in Ariyalur, 2 groups were held in Perambalur and 3 groups were held in Nilgiris to gather information. Each group had 12 persons. The participants had different ages and different genders. The groups consisted of a mix of water point users like (male & female, different age groups) and managers to confront the behaviours and practices around the water bodies. The number of participants in each focus group twelve persons.

**Results and Discussion:**

**Socio-Economic and Demographic characteristics:**

The analysis revealed that the Ariyalur, Perambalur and Niligiris districts, the total number of participants in the above district 84. Among them 36 persons in Niligiris and 24 persons in Ariyalur and Perambalur district. Average current age of the respondents were 24.6 years. Majority of respondents were Hindus 65.4 per cent constituted the followed by Christians 34.5 per cent. 60.9 per cent of the respondents belonging scheduled community, 39.0 per cent of others. The average household size was 3.8 persons. The educational status of respondent ranged from 18.1 per cent of illiteracy in 47.2 per cent of primary and 34.5 per cent middle level. 71.8 per cent of the respondent was currently married living with their husband, 17.2 per cent of separated and 10.9 per cent of widowed. All the women belonged from nuclear families. Average number of children of women was male 1.08 and 1.0 of female children. Buildings construction labour workers and housekeeping labour constituted the majority of women. The average monthly income of respondent was Rs. 9063.63 (Table 1).

**Table 1**

**Percentage distribution of Background characteristics of the**

**Respondents**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl.No** | **Background characteristics** | | Perambalur | Ariyalur | Niligiris |
| 1. | Current age | 15-19 | 2(8.3) | 4(16.67) | 5(20.8) |
| 20-24 | 5(20.8) | 3(12.5) | 12(33.3) |
| 25-29 | 8(33.3) | 7(29.17) | 9(25.0) |
| 30-34 | 9(37.5) | 10(41.6) | 10(27.7) |
|  | Total | 24(100.0) | 24(100.0) | 36(100.0) |
| Average current age | | 26.8 years | 26.8 years | 24.9 years |
| 2. | Gender | Male | 6(25.0) | 5(20.8) | 9(25.0) |
| Female | 18(75.0) | 19(79.1) | 28(77.7) |
| Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| 3. | Religion | Hindu | 12(50.0) | 16(66.6) | 17(47.2) |
| Christian | 8(33.3) | 8(33.3) | 12(33.3) |
| Muslim | 4(16.6) | - | 7(19.4) |
| Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| 4. | Caste | SC/ST | 13(54.1) | 12(50.0) | 25(69.4) |
| Others | 11(45.8) | 12(50.0) | 11(30.5) |
| Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| 4. | Marital status | Currently married | 17(70.8) | 14(58.3) | 25(69.4) |
| Widow | 5(20.8) | 7(29.1) | 6(16.6) |
| Separate | 2(8.3) | 3(12.5) | 5(13.8) |
|  |  | Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| 4. | Family Type | Nuclear | 18(75.0) | 15(62.5) | 23(63.9) |
| Joint | 6(25.0) | 9(37.5) | 13(36.1) |
| Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| 6. | Household size | 2-3 | 13(54.1) | 11(45.8) | 18(50.0) |
| 4-5 | 6(25.0) | 9(37.5) | 11(30.5) |
| 5+ | 5(20.8) | 4(16.6) | 7(19.4) |
| Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| Average size | | 3.8 | 4.0 | 3.9 |
| 7. | Educational Attainment | Primary | 3(12.5) | 2(8.3) | 5(13.9) |
| Middle | 4(16.6) | 5(20.8) | 5(13.9) |
| SSLC | 5(20.8) | 5(20.8) | 10(27.7) |
| HSS | 5(20.8) | 6(25.0) | 7(19.4) |
| Degree | 7(29.1) | 6(25.0) | 9(25.0) |
| Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| 8. | Occupation | Housekeeping | 7(29.1) | 10(41.6) | 17(42.2) |
| Construction work labour | 13(54.1) | 11(45.8) | 9(25.0) |
| Small business | 4(16.6) | 3(12.5) | 10(27.7) |
|  |  | Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| 9. | Monthly Income | <=10000 | 15(62.5) | 19(76.1) | 28(77.7) |
| 10000-15000 | 9(37.5) | 5(20.8) | 8(22.2) |
|  | Total | 24 (100.0) | 24(100.0) | 36(100.0) |
| Average Income | | 7041.6 | 7958.3 | 7388.8 |

Kandal is a heavy densely populated area in Niligiri city. It is an area inhabited by people various culture, religious and castes. In Thiruvalluvar street, people most belonging Scheduled Caste Arunthathiyar, their occupation sanitation work as well as most of the people retired aged person. Mostly the economic condition of the people living here is backward. Their occupation remains wage labour, i.e. boat industry work, agricultural labour, sanitary work, and women going to the domestic work. Most families live in rented accommodation. Even if have your own house, you don't have enough facilities. Their house is without any basic facilities like water, toilet and hygiene, cannot even accommodate two people in those houses, but more than 5 people living in those houses.

Kammand is called as ‘Atti’, that means a particular community people only living in a same place, which is called Atti. The Padugas community people living in the place, all follow the same culture, customs. Here most of the people having Tea Estate, agriculture land and they cultivate Carrot, Potato, and others. Moreover, their Living arrangements like house and other facilities also well.

New Line colony is fully occupied by the Scheduled Adidravidar Community people. Their living arrangements poor, population density is more. A retired person was shared the information regarding population increase as “in 1926 this New Line colony was established by 20 houses but now 250 houses development, as well as the actual population also increased”. This area people 50 per cent engaged as sanitary workers. The Most of the youth got degree but they are doing under employment in agriculture, building construction labor, and driver etc. It is the same situation in Gandhipet area. SC people living here are without adequate basic facilities. There is no public latrine, no private latrine, and no space to construct a private latrine. A notable event in Pilliyar Koil Street has been built by the British, it is 100 years old and they have built a toilet in that house. It is noteworthy that the residents of that house have been using the toilet for the past 100 years.

**Access and Availability of Water:**

Sources of drinking water for Perambalur Municipality is Kollidam river water. The people reported ‘once upon a time that area people used the open well and Thoraimangalam lake water drinking and non-drinking purpose, but at present cannot use the surface water due to pollution’. But most of the household having own bore well in the municipality, among them wealthiest people using RO system for purifying the water and others using for non-drinking purpose. In Ariyalur Municipalities has Arasan lake and Kurunjan lake and smalle pond also there, all were polluted. Since the entire water bodies have been covered with the vegetation and surrounded with the Seemai Karuvelam trees, the major resource which could irrigate several thousand acres of land in and around Ariyalur. Udaiyarpalayam Town panchayat has many small pond and more open well. In that Amman Koil Theppakulam Lake is very big and famous, the people using the water for non-drinking purpose like bath, wash dress and domestic animal purpose. Moreover in the Lake has water whole year. As well as a Nalla thanni Open well is there, the people using the water for only drinking purpose. Because of taste is good other sources of water. In Varatharajanpettai Town panchayat has many Lake, and most of the household has Open well. At the time that area people using the surface water for non-drinking and drinking purpose also.

The Perambalur Municipality’s people reported ‘once upon a time that area people used the open well and Thirumangalam lake water drinking and non-drinking purpose, but at present cannot use the surface water due to pollution’. But most of the household having own bore well in the municipality, among them wealthiest people using RO system for purifying the water and others using for non-drinking purpose.

Availability of drinking and non-drinking water is not available regularity in Perambalur Municiality, that means the municipality supplying from 8 days to 15 days once water like ward 1, 2, and 5. In ward 4 every seven get water. In the ward 5 ward, before the local body election drinking water came weekly once but after election it is coming 15 days once only. Upper middle-class people are dominating lower middle-class people in accessing Cauvery water due to technological support they get. In ward 1 and 2 (drinking water) Cauvery water comes once in ten days. In ward 4 every seventh day, Cauvery water is available for drinking purposes, In the same wards some wards not connected pipe for Cauvery water, as well public tape also not available.

In ward 6 having two drinking water sources one is Cavery water and another one is Uppodai water. The Municipality supplies the Cavery water once in 15 days, in between supplying Uppodai water in the same pipe line connection. But it is not enough for all the streets like such as Chithambaram Nagar, MM Nagar, Vengadajalabathi Street, and the Old SP office street. Likewise in ward 21 has same situation in availability of water. Ward 21 people used to get Cauvery water once in 15 days. In between, they Municipality supply local well water in the same pipeline. Some wards people reported, “Nearby the OHT wards get more water and others getting less water”. Some wards not available drinking and non-drinking water also. In ward 20, street name Anna Nagar, no water connection drinking or non- drinking purpose.

A woman reported, “In my street no good water pipe connection to my street, the good water available in government collector quarters only, so I would walk 2 kilometer to get good water”, In the same street another woman reported, “I and my family members staying in rental house, in that house no water connection, even non drinking purpose also”.

One woman was told, “in my street no water facility for drinking and non-drinking, but in the same street a small Pillaiyar Temple there, in that temple having a small bore well with small black syntax water tank, if the Temple priest when coming for doing Pooja, that time he would open the tank water, that time we would take the water, that pooja weekly two time like Tuesday and Friday only happen”.

In ward 7, Dheeran Nagar is especially for Transport corporation working people society, that area was developed in 20 years back, in that period that areas people buying own land and create open well with motor and tank for drinking purpose and supplying water through water pipe connection to the whole household from that day to till the day. After some years the Municipality started to supply the drinking water to that area. So Dheeran Nagar having two sources for drinking purpose. But now if newly joined workers come to the area for stay the previous corporation society people did not allow fetching the open well water, the new comers access only the Municipality water.

Ooty Municipality and Town panchayat administration not permit to bore well. The main sources of water are surface water like Paikara Dam, Emarold Dam, Avalanji Dam, Kuntha Dam, and etc. And the same most of the houses having Open well and save the rain water and use it. (i.e) in Mission Compound area, ward 12 all the houses having Open well. The source of water for people in Gandhipet area is spring water. The water that seeps from the mountain is made like small wells and used for drinking and other needs. A SC woman living on Michael Street suffers from no water connection and has to walk 2 miles up the hill for water, she said.

The water coming from the oasis in the area above New Line Colony is collected in a tank with a capacity of 20 thousand liters and distributed to the houses. They refer to the forest as an oasis. The capacity of the reservoir there is 20 thousand liters. During heavy rains, even if the pipes are broken by wild buffaloes, there is no water, and one has to risk one's life to repair it.

All the houses in the Mission Compound area have open wells. Wells are dug while building houses. Here municipal water is coming but it is not enough, water is coming only once in 7 days. In Kammandu area, water is supplied to everyone only through public taps. Here only one tribe lives in the area and they have a common well. Water is supplied to all the streets through pipes from it. No one's home has private plumbing. The general rule of the people is that everyone should get water from the street pipe. People in Kanthal area get water only once in 7 days. On other days, when water is scarce, they buy it for cash.

**Situation of surface water:**

Current situation of surface in Perambalur is very worst condition. 20 years back that people used the Thoraimangalam Lake, bond and open well water for drinking and non-drinking purpose. A 78 years elder person reported as “I am a farmer, in my early age (may be 30), we were using the open well water for agriculture as well as drinking purpose, and used the Eswaran Koil bond water for drinking purpose, but now all are polluted, now cannot use for any purpose”. At present the Thoraimangalam Lake is using for open defecation to the people, and also, they dumping the wastage in the lake, moreover in the lake full of filling cypress oak.

One woman reported her situation, that is, “we have an open well more than three generation, we were using that water for all the purposes, but now it was polluted, because when the lake water polluted automatically well also polluted”, now we cannot use the water, struggling for water”.

In Perambalur city’s open surface water bodies filled by wastage including plastics papers, cups, bottles, cloths, even the people throw their children’ napkin, and menstrual napkin also. So cannot use the surface water any purpose. Most of the surface water totally polluted in Perambalur. Water saving habit is absence in the area. Rare people having rain water harvesting system. In ward 4 Manathagobala puram a person saving the rain water. Compare with the Ariyalur district totally reverse condition of surface water. In Ariyalur Minicipality and Town panchayat like Udaiyarpalayam and Varatharajanpettai water bodies being good conditions.

**Quality of water:**

Perambalur Municipality is supplying combinedCavery river water, which is acceptable for drinking, colourlessand transparent and taste also good. Most of the household having own bore well that is salty water. But sometimes the water having color because the cavery river water comes fifteen days once, in between the bore water would supply in the same pipe, so the water taste changed. If have any problems like the pipe would damage in rainy seasons or any other issues the water would change color and taste. Most of the household having RO system for purify the water and use for drinking purpose.

Perambalur Municipality is supplying combinedCavery river water, which is acceptable for drinking, colourlessand transparent and taste also good. Most of the household having own bore well that is salty water. But sometimes the water having color because the cavery river water comes fifteen days once, in between the bore water would supply in the same pipe, so the water taste changed. If have any problems like the pipe would damage in rainy seasons or any other issues the water would change color and taste. Most of the household having RO system for purify the water and use for drinking purpose.

A man was explained, “In my early age we used the Sivann Temple Theppakula water for drinking purpose, but now even cannot bath because of pollution. And my grandfather and father using our open well water for agriculture purpose and drinking purpose also, but when the city developed our open well were become as waste water”. Some bodies told the same narration regarding quality of surface water in Perambalur Municipality.

Quality of Water in Ooty; When there is no rain, the water is clean, but during the rainy season, the water becomes cloudy and muddy due to the breaking of water pipes and damage by other wild animals. In Kandal, residents of Mushroom Factory Street have reported that the water is highly chlorinated, making it unfit for drinking.

Although the water coming from the New Line area is in good condition, it is mentioned that the water quality is not good during the rainy season. In Gandhipet area people drink tank water; there is one tank for every four houses or one tank for every 2 houses. The lime is covered with moss. The people there defecate in the open in the mountains, and during the mountain season, it is more likely to mix with the sinkholes, so the people their drink impure water.

Water problem varies from street to street. People in one street mentioned that water is coming continuously, while people in some streets have water coming day after day. They mentioned that water comes 24 hours a day, and on days when there is no water, water not fully available. In most of the areas, the water is drinkable, and in some places (Mushrooms factory street), there is a lot of chlorine in the water and the color of the water has changed. Upland areas have no access to water; they take spring water for drinking, but mentioned that sewer water also mixes near that water.

**Influences and Scarcity of water in the study areas:**

In above study areas’ people reported, most of the days the water not comes, so saving water is main problems, how if, big size vessels or tank needs, at the same time most of the people directly using the water they did not purify, so they don’t know how save water safely, like how covered, clean the vessels etc. For example, when used the unhygienic tank or plastics used for save the water insects may affect create or affects the water. Sometimes mosquitoes will be developing in that water. The school going children, working women, affect for scarcity of water. If no, water cannot cook, bath, and cannot use the toilet also.

A woman reported, “want to move from 2 km for fetch the good water, in this situation my, school going children also helping me and they went to school late”

A pregnant woman told, “This is summer time, I need water more for bathing and frequent use toilet but here no water, I feel ugly my body”.

They don’t practice hygiene, if they went to open defecation taken more than 10 minutes for clean the genital organs, each and every time passed urine they cannot clean their genital organs, adolescent girls did not change their menstrual pad with the proper interval, moreover they throughout the menstrual pad in open place like the lake. So, lack of personal hygiene and public hygiene with them.

A women reported, “most of the time I cannot wash my genital organs after passing urine, even went to motion cannot wash immediately taken more than 15 minutes for wash, because of scarcity of water”.

**Conclusion:**

As per Ministry of Housing and Urban Affairs, 135 litres per capita per day (lpcd) has been suggested as the benchmark for urban water supply. About 15.5 cups (3.7 liters) of fluids a day for men for drinking purpose and 11.5 cups (2.7 liters) of fluids a day for women. But in Perambalur Municipality person needs approximately 6702480 liters per day based on population. But the Municipality supply 49 lakhs water per day. In this situation can realise the scarcity of water to the city people and their problems.

The Municipality did not supply sufficient water to the whole Wards. Availability of water also insufficient, some wards get water within 5-7 days and some wards get fifteen days once drinking water. In other days non-drinking purpose water supplying in the same pipe line, so some times quality of water changed, like color and taste also changed. The nearby ward of the OHT gets more water, and other ward gets fewer amounts. Women, children, pregnant women, adolescent girls particularly in menstruation time are affected due to the lack of water.

Both districts having knowledge, attitudes and practice in usage of the surface water. In perambalur the people don’t have knowledge about surface water. Most of the people responses don’t know the surface water. They explained, total surface water was affected by Seema Karuvela Trees, and plastics, and other garbage so cannot use it. Some bodies did not have knowledge about their areas surface water bodies, even they forgotten the name of the lake and pond also. At the same time in Arialur district the people knows the importance of the surface water and they practicing the use of the surface water

In perambalur surface water bodies using for dumping garbage, and filled the Seema Karuvela Trees, the people using the surface of lake for open defecation. But Ariyalur district’s people maximum using the surface water for drinking and non-drinking purpose. Particularly in Udaiyarpalayam Town panchayat people like more open well water for drinking purpose because of taste. The entire households like more a particular open well, that name is Nalla Thannir Kinaru. The quality of water, status of water, knowledge, attitudes and practice was different. Both districts having different geographical nature, water resources. So, the Ariyalur district Knowledge, attitudes and practice are good compare with Perambalur district.

Ooty is known as the queen of hills, but today the condition of Ooty is very bad. Although the water resources here were an important resource for Tamil Nadu and neighboring Karnataka, A large part of the mountain has been deforested and the water resources are decreasing and people are living without water and sanitation. The people who traditionally lived here were the Tamils, but during the Mughal era, the Mughals migrated and became slaves of the British under the rule of the British and claimed Utkai Hill as their own. Race, economy, system of government and the ever-increasing population are the causes of the water problem. Man disturbs the wildlife by building his luxury bungalows where the wildlife lives, but humans consider the "animals" as disturbing them.

People who have accumulated property worth crores, people in Chennai, Bangalore, etc. also build houses on the top of the hill to reduce the summer heat and live luxuriously, so that the spring water generated from there is blocked and there is water shortage. Ooty's natural erosion and man-made debris have led to water scarcity.

**Suggestions:**

Since the creation of this earth on which we live, the five elements, which are the source of living beings, have renewed themselves and acquired a lasting character. This is nature's best sustainable scientific method. Unfortunate man failed to understand the nature of the earth with his knowledge and called what appeared to him as scientific knowledge and created a change in the land, water, air, and fire that existed since the beginning of the earth and spoiled its balance. When human science started in the world, nature started to perish. Nature has created a perfect scientific method and it has lasted for ages. But not only does man's knowledge fail to understand natural science, he destroys nature and seeks harm for himself without realizing that creating with his knowledge is an act of destroying nature. Land, air, water, fire and sky those five elements is base to the living things. Five elements are the source of living being. But Man pollutes the land, air, air and water with his knowledge and meets its effects. That is, he hurts his eyes with his own hand. Since both water and land are visible to the eye, man owns them as much as he wants with his strength and desire moreover human sense changed water and land nature and spoiled it. The result is that man has become unable to live by using them. So this study suggested:

The major conclusion drawn from this research stress the need for some of the following recommendations:

* Cypress oak is major reason for scarcity of water, especially in Perambalur and Ariyalur District. Urgent need to remove the cypress oak, it is serious issues, because it can observe moisture from air and grow healthy, so even in dry will became dry more and more. So should take action immediately to destruct and safe the surface water.
* Should develop the rain water harvesting in Municipality administration level, and motivate the individual also.
* Should prevent the waste water generation.
* Should organize the awareness camp to the entire people get surface water.
* Perambalur Municipality ward members should take effort to clean the surface water bodies and ratification the access and availability of drinking and non-drinking water.
* Ooty Municipality, Town Panchyat ward members should take effort to clean the surface water bodies and ratification the access and availability of drinking and non-drinking water.
* Repair of broken pipes, replacement of plastic pipes with copper pipes, more flexible
* Construction of drinking water storage tanks and appropriate measures should be taken to prevent rodents from living in drinking water tanks.
* Ooty Municipality should increase water supply to meet the growing population.
* Refusal of entry to new immigrants to Ooty.

**References:**

* Anuj Behal, Dimple Behal, (2021), “India’s water crisis: It is most acute for women”, DownToEarth, <https://www.downtoearth.org.in>
* **ArpitJain, Reshma Anand, (2020), “Water and Sanitation”** https://idronline.org
* Census of India, [www.censusindia.gov.in](http://www.censusindia.gov.in)
* Deborah Balk, Mark R. Montgomery, Hasim Engin, Natalie Lin, Elizabeth Major, Bryan Jones, 2019, “Urbanization in India: Population and Urban Classification Grids for 2011” Data Descriptor, MDPI,
* Dr.R.Elangovan, 2021, “Water Water”, Coimbatore Research Centre, Udumalaipettai
* Perambalur Municipality. [www.perambalur.nic.in](http://www.perambalur.nic.in)
* Nagarajan, Ganesh; Megson, Jody; Wu, Jin, 2021. “How one of the world’s Wettest Major Cities Ran Out of Water” Bloomberg News.
* NITI Aayog,
* Public work Department, Govt. of TN
* S. Arul Pennadic Kamaliya, S.Elamathi, M.Kaviya, K.Keerthana, Mr.E.Suresh kumar (2017), “Water Scarcity Analysis for Perambalur Town by using Arc-Gis” SSRG International Journal of Geo informatics and Geological Science - (IJGGS).
* Kaushik Deka (2021), India's urban water crisis: Cities at risk of running out of water, Indiatoday Magazhine, New Delhi March.
* L. Kanthimathi, (2020),“conservation groups put the spotlight again on the palmyra” The Hindu, E-Newspaper, September 12.
* Shakeel Anwar (2017), “Water Resources”, [www.jagranjosh.com](http://www.jagranjosh.com)
* Ministry of Jal Shakti, (2020), PIB Delhi.
* WHO, 2022, https://www.who.int/news-room.